

LXII.—*A Collection of Mammals from Northern and Central Mantchuria.* By OLDFIELD THOMAS.

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THE British Museum has acquired from Mr. Alan Owston a collection of small mammals made in Mantchuria by Orié, a Japanese, who collected at the same time the birds recently enumerated by Mr. Collingwood Ingram in the 'Ibis' \*.

The majority of the specimens were obtained in the Khingan Mountains, at about an altitude of 3800 feet, at the point where the Siberian Railway cuts the range. The remainder were obtained in the neighbourhood of Chang Chun, in Kirin Province, on the Harbin-Port Arthur branch of the railway.

These Mantchurian mammals are of particular value to us as being from an intermediate locality between the Ussuri and Amur region, worked by Schrenck and others, and the Mongolian plateau, whence the Museum received the valuable series collected by M. P. Anderson and presented by the Duke of Bedford †.

As might be expected, many of the forms are intermediate in character between the Mongolian and Amur animals, and form intermediate but well definable subspecies.

The collection consists of about 100 specimens, belonging to 15 species, of which five prove to need description as local subspecies.

1. *Vespertilio murinus*, L.

♀. Chu Chia Tai, Kirin Province.

The size of this specimen is quite as in Scandinavian *murinus*, not as in the Chinese *superans*.

2. *Erinaceus amurensis*, Schrenck (?).

♀. Chang Chun, S. Mantchuria.

The inter-relationships of *E. amurensis*, Schrenck, *dealbatus*, Swinh., *orientalis*, All., *chinensis* and *ussuriensis*, Sat., need much more material for their elucidation. All are very closely allied, and owing to the almost complete ignoring by each writer of his predecessor's work, no trustworthy comparisons have been made between them.

\* Ibis, (9) iii. p. 422 (1909).

† See P. Z. S. 1908, p. 104.

3. *Mustela alpina*, Gebl.

♀. Khingan Mts.

4. *Sciurus vulgaris manchuricus*, subsp. n.

2 ♂, 3 ♀. Khingan.

Colour in winter pelage very dark blackish grey, with scarcely a trace of rufous (nearest to grey no. 4, Ridgway). A certain number of whitish or white-tipped hairs mixed with the grey. Ear-tufts well-developed, black. Tail very bushy, black, its inferior aspect nearly as uniformly dark as the superior, without tinge of rufous. Size very large, the skull conspicuously larger than in any other of the eastern races of *S. vulgaris*.

Dimensions of the type (measured in flesh) :—

Head and body 250 mm. ; tail 205 ; hind foot 61 ; ear 30.

Skull : greatest length 57 ; front of  $p^4$  to back of  $m^3$  9.6.

*Type.* Adult female. Original number 10. Collected 11th May, 1908.

The Khingan squirrel is readily distinguishable from its nearest allies, *S. v. calotus*, the Altai form, *rupestris* of Saghalien, and *orientis* of Hokkaido and Korea, by its markedly larger size, as indicated by its skull. In colour also it is of a much darker grey than any of them.

5. *Eutamias asiaticus*, Gm.

10 ♂, 11 ♀. Khingan Mts.

6. *Citellus mongolicus ramosus*, subsp. n.

3 ♂, 2 ♀. Chu Chia Tai, Kirin Province.

4 ♂, 3 ♀. Fan Chia Tun, Kirin Province.

Both places not far from Chang Chun, the junction of the Kirin branch of the Harbin-Port Arthur railway.

Colour as in *C. m. umbratus*, or even slightly darker ; less distinctly speckled. Tail as bushy as in true *mongolicus*, that of *umbratus* far less so.

Dimensions of the type (measured in the flesh) :—

Head and body 198 mm. ; tail 68 ; hind foot 37.

Skull : condylo-basal length 43.5.

*Type.* Adult male. Original number 67. Collected 27th July, 1908, at Fan Chia Tun.

When I described *C. mongolicus umbratus*\*, from the

\* P. Z. S. 1908, p. 970.

Mongolian plateau, I remarked on the shortness of its tail-hairs, but laid no stress on the character, supposing it to be due to season. But the present series was collected at exactly the same time of year (end of July and beginning of August), and it is now evident that the material difference in the bushiness of the tail is a genuine local character. The terminal tail-hairs of *umbratus* are 10–12 mm. in length, those of *ramosus* 16–20, as is also the case in the much paler typical *C. mongolicus*.

It seems probable that the plateau form *umbratus* may deserve to be separated specifically on account of its less bushy tail, while *ramosus* would remain as a darker eastern subspecies of *n. mongolicus*, inhabiting Southern Mantchuria.

7. *Arctomys sibiricus*, Radde.

3 ♂ (adult and two young). Khingan Mts.

8. *Mus caraco*, Pall.

♀. Khingan Mts.

♂ (young). Chu Chia Tai, Kirin Province.

This would appear to be a short-footed Eastern representative of *M. norvegicus*, but the only adult specimen has lost its skull, so that I am unable to give any definite opinion about it.

9. *Mus wagneri manchuricus*, subsp. n.

♂, 2 ♀. Fan Chia Tun, Kirin Province.

6 ♂, 4 ♀. Chu Chia Tai, Kirin Province.

A still darker form than *mongolicum* of the pale Central-Asian *M. wagneri*.

General colour above smoky drab, decidedly darker along the middle of the back. Under surface white, generally in marked contrast to the colour of the sides, but there is often a drabby suffusion over the belly, which sometimes even clouds the sharp definition of the upper and under sides. Proectote of ears a little darker than the head. Hands and feet dull white. Tail greyish drab above, lighter below.

Skull as usual.

Dimensions of the type (measured in the flesh):—

Head and body 85 mm.; tail 56; hind foot 16·5; ear 11·5.

Greatest length of skull 21·3.

*Hab.* (of type). Chu Chia Tai, Kirin Province.

*Type.* Adult female. Original number 89. Collected 22 August, 1908.

Going eastwards from the dry region of the Mongolian Plateau and Shensi, we get again a still darker form of the *Mus musculus* group than the one I named *M. wagneri mongolium* in 1908\*. The specimens are quite uniformly darker, their sides being about as dark as are the central dorsal areas of the paler forms. The mice obtained by Mr. Anderson at the Imperial Tombs to the east of Peking are intermediate in colour as in locality.

All these mice would seem to be wild-living forms, not true house-mice.

10. *Cricetulus griseus fumatus*, subsp. n.

5 ♂, 1 ♀. Chu Chia Tai, Kirin Province.

♂ (young). Fan Chia Tun, Kirin Province.

Essential characters as in *C. griseus*, but the colour darkened throughout. General colour above between brocoli-brown and hair-brown of Ridgway. Black dorsal line heavier, more distinct, and carried forward more definitely on to the crown of the head. Under surface grey no. 8, the tips of the hairs grey no. 10.

Skull quite as in true *griseus*.

Dimensions of the type (measured in the flesh):—

Head and body 108 mm.; tail 29; hind foot 16.5; ear 16.

Skull: greatest length 28.5; upper molar series 3.8.

*Hab.* (of type). Chu Chia Tai, near Chang Chun, Kirin Province.

*Type.* Adult male. Original number 97. Collected 27 August, 1908.

This Mantchurian race of the common striped hamster of N. China is readily distinguishable by the general darkening of its colour, and the greater development of its dorsal dark line.

11. *Evotomys rutilus*, Pall.

2 ♂, 3 ♀. Khingan Mts.

12. *Myospalax psilurus*, M.-Edw.

5 ♂, 5 ♀. Khingan.

The most careful comparison of these specimens with three examples of *M. psilurus* from between Peking and Tientsin, therefore practically topotypical, presented by Mr. E. B. Howell, fails to show the very slightest difference,

\* P. Z. S. 1908, p. 106.

considerable as is the geographical distance between the two localities. Externally the colour, ordinary presence of frontal spots, and the proportions of the claws are alike in the two series, while the skulls and teeth appear to be identical in every detail. In size Mr. Howell's specimens are a little smaller than those from Khingan, but the typical skull in the Paris Museum, which I have myself measured, is exactly as in average specimens from the latter place.

13. *Lepus timidus*, L.

♀. Khingan, April 1908.

In changing pelage.

14. *Ochotona (Pika) hyperborea mantchurica*, subsp. n.

7 adult and 3 young specimens. Khingan.

Most allied to *O. hyperborea cinereo-fusca*, Schrenck, of which the Museum possesses a summer skin from the Kentei Mts. and a winter one from the Ussuri, both collected by Dörries.

Size decidedly larger, the skulls uniformly larger than those representing *cinereo-fusca*.

In winter pelage (hair of back about 18 mm. in length) the upper surface is near "broccoli-brown" of Ridgway, becoming clearer grey on the head and fore back, and warmer—near "clay-colour"—on the rump. In an Ussuri specimen in the same pelage the crown and back are washed with russet-brown, only the nape being clearer grey. Under surface dull whitish with a wash of clay-colour, the bases of the hairs slaty as usual.

Summer pelage (fur about 12 mm. in length) between "cinnamon" and "russet," that of *cinereo-fusca* being nearly true "russet." Sides and belly paler cinnamon, the latter verging into "ochraceous buff."

Dimensions of the type (measured in flesh):—

Head and body 178 mm.; hind foot 28.5; ear 18.

Skull: upper length 43.4; condylo-basal length 41; greatest breadth 22; nasals 14.2; interorbital breadth 4.3; breadth of brain-case 17; palatilar length 15.5; palatal foramen 6.4; upper tooth-series (alveoli) 8.1.

*Type.* "Male." Original number 23. Killed 18th May, 1908.

These Pikas form an interesting series just covering the change of pelage from the winter coat (specimen killed 18 May) to the summer (June 23), the other specimens showing intermediate phases between the two. Our Dörries

specimens from the Kentei and Ussuri, representing Schrenck's "*Lagomys hyperboreus*, var. *cinereo-fusca*," are without dates, but the present series enables me to determine them with confidence as being respectively summer and winter examples of one form.

This animal would appear to be not more than subspecifically distinguishable from *cinereo-fusca*, and as Schrenck considered that a variety of *hyperborea* I do the same for the present form; but the intergradation with the Tschuktschi Pika may hereafter prove to be broken, and the Amur and Mantchurian forms to be worthy of specific separation from the more northern species.

15. *Capreolus bedfordi*, Thos.

♀ and two young. Khingan Mts.

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LXIII.—On the Regular Hexactine Spicule of Hexactinellida.  
By R. KIRKPATRICK.

THE regular hexactine spicule characteristic of Hexactinellid sponges has three axes crossing at right angles through a common centre and corresponding with the axes of the regular crystalline system; but the silica of which the spicule is composed is isotropic and amorphous. What is the meaning of the form of the regular hexactin\*? Is it due to purely organic causes, or is its shape influenced by its mineral characters; or do both of these factors contribute? Further, if its form is due to biological causes, how have they fashioned the regular hexactine shape? Before attempting to suggest an answer to these questions I will refer to theories already put forward by Schulze and Minchin.

The typical Hexactinellid sponge is a cup-shaped lamina with a central layer of thimble-shaped flagellated chambers suspended between an outer dermal and an inner gastral layer of delicate network. Schulze † was of opinion that the regular hexactine spicule came into existence because it was adapted to support the thimble-shaped flagellated chambers.

Minchin ‡ has stated his belief that the spicules arose before the flagellated chambers were formed, that the stauractin preceded the hexactin, and that the symmetry of these two

\* I use the term actine as an adjective, and actin as a substantive.

† 'Challenger' Report. Hexactinellida, 1887, p. 504.

‡ "A Speculation on the Phylogeny of the Hexactinellid Sponges," Zool. Anzeiger, 1905, xxviii, p. 439.